

ANNALS OF NATURAL HISTORY.

XLV.—*Further remarks on the British Shrews, including the distinguishing Characters of two Species previously confounded.* By the Rev. LEONARD JENYNS, M.A., F.L.S., &c.

IN a paper published in 1837 in the ‘Magazine of Zoology and Botany,’* I endeavoured to prove that the *Sorex Araneus* and the *S. fodiens* of English authors were not respectively identical with the two species so called on the continent. The former I referred to the *S. tetragonurus* of Hermann; and I added the descriptions of what I considered to be two remarkable varieties of that species, which I represented as very variable in its characters. Further attention to the subject has, however, convinced me of an error with regard to one of these supposed varieties, which I am anxious to correct. I allude to the large specimens, found in marshy districts, described as *var. 1* in that paper, of which I have since obtained individuals of all ages, and in sufficient number to establish beyond a doubt that they are perfectly distinct from the smaller, though hardly perhaps more common, species, which is found in many situations, and which seems to be the one most generally, if not exclusively alluded to, in the works of British zoologists.

It will be my object in this paper, *first*, to point out the distinguishing characters of these two shrews; *secondly*, to make some remarks upon their nomenclature, which will require correction, as well as upon the nomenclature of *S. fodiens* and *S. remifer*; and *thirdly*, to give a synoptic view of all the species of *Sorex* hitherto met with in Great Britain, with their essential characters and principal synonyms, so far as these last can be determined. I conceive that this synopsis, which will include the characters of the genus, as well as those of its subordinate divisions, will not be unacceptable to those

* Vol. ii. p. 24.

naturalists who interest themselves with our native Fauna, and who may wish to know what our present knowledge of the species of this puzzling group amounts to.

The *square-tailed shrew*, by which name I designate the larger of the two species above alluded to, differs from the *common shrew* of English authors, not only in its *superior size*, but in the characters of the *snout*, *feet*, and *tail*, and to a less extent in the *dentition* and *colours*. It may be thought that some of these characters are not to be depended on after what I myself have stated on this subject in a former paper. But it must be remembered that, though variable, the variations are in some measure due to age; and that, if we can obtain individuals of different ages, we may at once know what allowance to make for this circumstance. Also, although the same character may in some cases vary in different individuals of the same age, yet it still varies within limits, and by examining a number of specimens we may obtain an average which will be tolerably constant in a given species. Thus with regard to the *relative size* of these two species, I find the average length of the *square-tailed shrew* (measured from the extremity of the snout to the anus) to be about two inches and three quarters, individuals being occasionally met with that exceed three inches; whereas the average length of the *common shrew* is hardly two inches and a half, nor did I ever meet with a specimen that was more than two inches and eight lines. Hence the *maximum* size attained by the latter species is hardly equal to the *average* size of the former. The characters of the *snout* depend in some measure upon age. I have noticed in my former paper, that this part is more attenuated in old than in young specimens; at least it appears so, from the circumstance of its not increasing much in breadth as the animal grows. But it will be at once manifest, on comparing individuals of the same size, that in the *square-tailed shrew* the snout is much broader, more swollen at the sides, and more obtuse at the extremity than in the *common shrew*. In the former species the distance between the eyes is contained barely once and a half in the distance from the eyes to the end of the snout. In the latter it is contained twice in the same. The *feet* are also obviously different in the two species. Those of the *square-*

tailed shrew, the fore feet especially, are broad and strong as if formed for digging; whereas those of the *common shrew* are comparatively weak and slender, and much less adapted for that purpose. The *tail*, notwithstanding the changes induced in it by age and other circumstances, also offers good distinguishing characters. Its average length appears to be greatest in the *common shrew*, although this species is, in all other respects, smaller than the other. It is also stouter in this species, nearly cylindrical, and of more uniform thickness, the end terminating abruptly; better clothed with hair at all ages, the hair standing very much out, especially in young specimens, and though extending at the extremity beyond the bone to the distance of a line or more, seldom converging into a point to form a pencil. In the *square-tailed shrew*, as its name indicates, the tail is more decidedly quadrangular at all ages. It is also slenderer, and slightly tapering at the tip; the hair not so long or copious as in the *common shrew*, and never standing out, but, on the contrary, closely appressed in young specimens, and forming at the extremity a short but fine pencil. As age advances, the hair in this species often becomes so much worn, as to leave the tail nearly or quite naked, without any pencil, and with the angles at the sides extremely obvious. The only differences in the *dentition* of these two shrews are to be seen in the relative size and position of the lateral incisors. In the *square-tailed shrew*, the first and second of these teeth in the upper jaw are nearly equal; so likewise are the third and fourth; but the former two are obviously larger than the latter two: the fifth is much smaller than any of the preceding ones, very inconspicuous, and generally set a little within the line of the others, so as to be not readily seen from without. In the *common shrew*, the first four of these incisors diminish in size more gradually, and form a more regular series; the fifth is also larger in relation to the others, more in the line, and more obvious externally. The *colours* of these two species are not very dissimilar; but they appear to be less variable, and generally somewhat darker, in the *square-tailed* than in the *common shrew*. The back, in the former, is not so obviously tinged with reddish; and I alluded in my previous paper to an appearance of three colours, occupying respect-

ively the back, sides, and abdomen, which I have noticed in most of the specimens that have fallen under my observation. I need only add, indeed, to what is there stated, that the upper and under surfaces of the tail are like those of the body, but more reddish, with a tolerably well-marked line of separation at the sides: occasionally, however, the tail is of a uniform reddish brown above and below. The snout is always black at the extremity. In the *common shrew*, a rufous or yellowish tinge more or less pervades the whole of the body; and the feet as well as the under parts of the snout (even to the tip) and tail are often testaceous.

In addition to the above differences, which are founded upon external characters, I may notice a marked dissimilarity in the *cranium*, which is broader and much more depressed in the *square-tailed* than in the *common* species, and with the profile or chaffron rather more arched.

Having pointed out the distinguishing characters of these two shrews, it becomes necessary to speak, in the next place, of their nomenclature. The larger of the two I have already designated by the name of *square-tailed*, not only because the title is extremely applicable, but because I believe this species to be the true *S. tetragonurus* of Hermann and Duvernoy. It is also decidedly identical with two specimens brought from Germany last summer by Mr. Ogilby, to one of which the name of *tetragonurus* is attached. But at the same time I feel some doubts whether it be the *S. tetragonurus* of Geoffroy and of other authors. With regard to the smaller of the two species, or that which I have called above *common shrew*, I find it impossible to identify it with complete certainty with any of those described by continental naturalists. In fact there are but two species belonging to this division of the genus *Sorex* (exclusive of the *S. fodiens* of Duvernoy), the characters of which, so far as I know, have been given in sufficient detail to enable them to be recognised. These are the *S. tetragonurus* and the *S. constrictus* of authors. The former (at least as described by Duvernoy) I have already considered to be the same as the *square-tailed* shrew of this paper. The latter, which was also established by Hermann, Duvernoy considers as the young of *S. fodiens*; but this cannot be said of the *S.*

constrictus of Geoffroy, which is evidently distinct, and which appears in many of its characters, especially its size and the form of the cranium, to resemble the *square-tailed shrew* of this paper, or Hermann's *S. tetragonurus*; whilst, on the other hand, the *S. tetragonurus* of Geoffroy, I think may possibly be the same as my *common shrew*. That the name of *tetragonurus* has been thus applied by Hermann and Geoffroy to two distinct species, though Geoffroy did not confound the species themselves, is further probable from the circumstance, that the *S. cunicularius* of Bechstein, which seems closely to approach the square-tailed shrew of this country, Duvernoy considers as synonymous with the *S. tetragonurus* of Hermann, whilst Geoffroy regards it to be the same as his *constrictus*. It is useless looking to any of the later systematic authors with the view of solving this question, as none of them have added anything in their descriptions of the above species from their own observation. And it appears to me that the only step to be taken is to impose a new name on the *common shrew* of this country, reserving the name of *tetragonurus* for the *square-tailed shrew* of this paper, which I believe to be the true *tetragonurus* of Hermann and Duvernoy. It is not at all improbable that the former may be the *S. constrictus* of some authors, but it appears to me a more preferable step to run the hazard of increasing its synonymy, than of adding to the confusion which exists at present by giving it a name, which may one day be proved to have been applied in some cases to a distinct species. The name which I propose for it is that of *S. rusticus*.

Before I proceed to the synopsis of British shrews with which I propose to conclude this paper, I may say a few words with reference to the nomenclature of *S. fodiens* and *S. remifer* of this country. I stated in a previous memoir that the former was not the *S. fodiens* of Duvernoy, and judging from the characters of the teeth which he assigns to his species, I see no ground for revoking that opinion. But further investigation has led me to believe that it is the real *S. fodiens* of Gmelin, as well as of Bechstein, Brehm, and Wagler. I find also, in confirmation of this latter point, that in a second memoir on the shrews read by Duvernoy to the Strasburg Na-

tural History Society in January last*, he assigns the same dentition to the *S. fodiens* of Gmelin as he assigns to that subdivision of the genus *Sorex*, to which our own species undoubtedly belongs. He has also considered the *S. fodiens* of Gmelin as synonymous with the *S. carinatus* of Hermann.

With regard to the *S. remifer* of English naturalists, I have only to observe that it appears to be so very much smaller than the *S. remifer* of Geoffroy, that I can hardly believe it to be the same as that species. And whether it be or be not, the name first imposed on it by Sowerby having the precedence, it will be more proper that in accordance with that author it should be called *S. ciliatus*.

Synopsis of British Shrews.

SOREX, Linn.

Two middle incisors much produced; the upper ones curved, with a spur behind more or less prolonged; the lower ones almost horizontal; lateral incisors or false grinders, small, $\frac{3-5}{2} : \frac{3-5}{2} \ddagger$; true grinders $\frac{4}{3} : \frac{4}{3}$; fur short and soft; snout attenuated; tail long.

1. AMPHISOREX †, Duv.

Middle incisors in the lower jaw with the edge denticulated; the upper ones forked, the spur behind being prolonged to a level with the point in front; the lateral incisors which follow in the upper jaw 5 in number, and diminishing gradually in

* For an abstract of this paper see L'Institut, No. 226. p. 111.

† None of the *British* species yet discovered have less than four lateral incisors above on each side.

‡ This group was denominated by M. Duvernoy in his first memoir HYDROSOREX; but having discovered that it did not include the *S. fodiens*, Gmel., a species pre-eminently aquatic, he has since transferred the name of HYDROSOREX to the next group, to which this species apparently belongs.

Of Duvernoy's first subordinate group (SOREX, Duv.) no species has been as yet detected in Great Britain. It may be useful, nevertheless, to annex its characters, which may assist in determining any which may chance to be met with.

Middle incisors in the lower jaw with an entire or simple edge; the upper ones notched, or with the spur appearing as a point behind; the lateral incisors which follow in the upper jaw three or four in number, and diminishing rapidly in size from the first to the last; none of the teeth coloured.

According to Duvernoy this group comprises all the extra-European species, besides two (*S. Araneus*, Geoff., and *S. leucodon*, Herm.,) which are met with on the continent.

size from the first to the last ; all the teeth more or less coloured at their tips.

Sp. 1. *S. rusticus*, Jen. (*Common Shrew*.) Snout and feet slender : tail moderately stout, nearly cylindrical, not attenuated at the tip, well clothed with hairs, which are very divergent in the young state, and never closely appressed.

S. Araneus, *Man. Brit. Vert.* p. 17.—*S. tetragonurus*, *Geoff. Ann. Mus.* xvii. p. 177. pl. 2. f. 3 ?—Fetid Shrew, *Penn. Brit. Zool.* i. p. 125.—Common Shrew, *Bell. Brit. Quad.* p. 109.

Hab. Appears principally to frequent dry situations ; gardens, hedge-banks, &c.

Var. β. *S. Hibernicus*, Jen. (*Irish Shrew*.)

I am indebted to Mr. R. Ball, of Dublin, for a specimen of the common shrew of Ireland, which I believe to be a distinct species ; but as I have seen only one individual, I shall not at present consider it as more than a variety of the *S. rusticus*. It differs principally in its smaller size (although evidently an *old* individual) ; in its more uniform colours, the under parts being similar to the upper, only somewhat paler ; and in the form of the tail, which is not so stout or so long as in the common English shrew, and rather more tapering at the extremity. The hairs on the tail are short and very much worn, the apical half of the tail being nearly naked, and consequently without any pencil at the tip. The teeth are so much worn down that their original characters can hardly be ascertained ; but the lateral incisors above appear more crowded, or set closer together, than in the English shrew. The feet and ears are similar ; the snout not materially different, but the distance from its extremity to the ear a little longer in proportion ; this, however, may possibly be due to age. The following are the exact dimensions of this specimen :

	inch. line.	
Length of head and body.....	2	1
———— head	0	9 $\frac{3}{4}$
———— tail	1	3 $\frac{1}{2}$
———— hind foot.....	0	5 $\frac{1}{2}$
———— fore foot	0	3 $\frac{1}{4}$
———— ears.....	0	1 $\frac{1}{2}$
From ear to eye	0	3 $\frac{1}{2}$
———— to end of the snout.....	0	8

Sp. 2. *S. tetragonurus*, Herm. (*Square-tailed Shrew*). Snout broader than in the last species : feet, fore especially,

much larger: tail slender, more quadrangular at all ages, and slightly attenuated at the tip; clothed with closely-appressed hairs in the young state, in age nearly naked.

S. tetragonurus, Duvern. in *Mém. de la Soc. d'Hist. Nat. de Strasb.* ii. Liv. 1. p. 19. pl. 1. f. 2.—*S. cunicularius*, Bechst. *Naturgesch. Deutsch.* i. p. 879. pl. 10. f. 2. (?)—*S. constrictus*, Geoff. *Ann. du Mus.* xvii. p. 178. (?)—*S. Araneus*, var. 1. *Mag. of Zool. and Bot.* ii. p. 37*.

Hab. More attached to marshy districts than the last species, though not confined to them.

Var. β.—*S. castaneus*, Jen. (chestnut shrew).—*S. Araneus*, var. 2. *Mag. of Zool. and Bot.* ii. p. 39.

Hab. Found in marshes with the preceding.

Not having been able to procure any more specimens of this shrew, I shall still consider it as a mere variety of the *S. tetragonurus*, though a closer investigation of its characters has led me strongly to suspect that it will one day be found to constitute a distinct species. And in that case, the name which I have given it above, derived from its peculiar colour, might be adopted for it. The dimensions and distinguishing characters of both sexes will be found in the 'Magazine of Zoology and Botany,' as already quoted. In addition, however, to what is there stated, I may notice a slight difference in the *cranium*, which is broader posteriorly and rather more elevated in the crown than that of the *S. tetragonurus*, thus accounting for the "fulness about the head" alluded to in my first description of this variety. It is also slightly longer, and these superior dimensions are even observable when compared with those of the *cranium* of an aged specimen of *S. tetragonurus*, of which the entire length exceeded by more than half an inch that of the variety in question. The form of the *snout* is not very different in these two shrews, but it is rather more attenuated at the extreme tip in the *chestnut* than in the *square-tailed shrew*. The dentition also is much the same.

2. HYDRÓSOREX†, Duv.

Middle incisors in the lower jaw with an entire edge; the upper ones notched, or with the spur appearing as a point be-

* Perhaps to this species is to be referred the large shrew mentioned in Loudon's Magazine of Natural History, vol. iii. p. 471, met with in a clover-field, which the writer was unable to identify with either of our then known British species.

† Denominated in M. Duvernoy's first memoir by the name of ΑΜΦΙΣΟΡΕΧ.

hind; the lateral incisors which follow in the upper jaw four in number; the first two equal, the third somewhat smaller, the fourth rudimentary; the tips of all the teeth a little coloured.

Sp. 3. *S. fodiens*, Gmel. (*Water Shrew*). Deep brownish-black above, nearly white beneath, the two colours distinctly separated on the sides: feet and tail ciliated with white hairs.

S. fodiens, Gmel. i. p. 113. *Bechst. Naturgesch. Deutsch.* i. p. 872. pl. 10. f. 1. *Brehm, in Bul. des Sci. Nat.* (1827) xi. p. 287. *Man. Brit. Vert.* p. 18.—*S. bicolor*, Shaw, *Nat. Misc.* ii. pl. 55.—*Crossopus fodiens*, Wagler, in *Isis*, 1832 (fid. Duv.).—*Water shrew*, Penn. *Brit. Zool.* i. p. 126. *Bell, Brit. Quad.* p. 115.

Hab. Marshes and banks of ditches; but it is occasionally met with at a distance from water.

Obs. Montagu has recorded an individual which had the throat and breast pale ferruginous*. Fleming, in his description of this species†, states that there is a black spot in the middle of the throat, with a line of the same colour along the middle of the belly; also that the tail is nearly white at the tip. Whether these variations of colour be merely accidental, or dependent upon sex or season, or whether characteristic of any allied species confounded with the above, remains yet to be determined. Montagu's specimen was a male; so likewise was one mentioned by a writer in Loudon's Magazine of Natural History‡, in which the throat is said to have been of a deep chestnut. But nothing of this colour was observable in any of the specimens I have met with in Cambridgeshire, of which at least two have been males taken during the summer months. Neither have I ever seen the markings spoken of by Fleming; but they are noticed by Bechstein in his description of this species. Also the writer in Loudon's Magazine, above alluded to, states that a week after the capture of the male with the chestnut-coloured throat, a female was taken, in which the throat was grayish. Both these last were caught in a cellar during winter; and I am inclined to suspect that they were the sexes of a species possibly distinct from the one more commonly met with, in which the under parts, with the exception of a triangular dusky spot on the vent, are nearly pure white.

* Linn. Trans. vii. 276.

† Brit. An. p. 8.

‡ Vol. iii. p. 471.

Sp. 4. *S. ciliatus*, Sow. (*Ciliated Shrew*.) Black above, greyish black beneath; throat yellowish ash: feet and tail strongly ciliated with greyish hairs.

S. ciliatus, Sow. *Brit. Misc. pl.* 49.—*S. remifer*, Yarr. in *Loud. Mag. Nat. Hist.* v. p. 598. *Man. Brit. Vert.* p. 18.—Oared shrew, *Bell. Brit. Quad.* p. 119.

Hab. Found in the same situations as the preceding.

Note.—Before concluding it may be well to apprise those naturalists who may be led by Duvernoy's memoirs, or by either of my own, to examine the dentition of our native shrews, that attention must be paid to the age of the individual before determining the true characters of the teeth in any species. It is only in adult middle-aged specimens that they can be safely trusted. In the young always, and occasionally in the very old, the teeth have an ambiguous appearance, which might easily mislead a hasty observer. In the instance of the former, this ambiguity arises from the circumstance of the teeth not showing themselves at first, but being covered over with the periosteum, which is common to them and the bone in which they are implanted*, and which is not thrown off till after the individual has considerably advanced in growth, and so far assumed all its other characters as to appear mature. Also this skin is not cast off all at once, but will be found still investing the smaller teeth after that the larger and more pointed ones are protruded. In a specimen of the *S. tetragonurus*, which measured 2 inches 2 lines in length, exclusive of the tail, and which, until the teeth had been examined more closely, was never suspected to be immature, the molars and the middle incisors were found prominent, whilst all the lateral incisors were still concealed by the periosteum, so as to present the appearance of one continuous bone or tooth, with a sharp edge, filling the entire space between the

* There are some peculiarities connected with the first formation of the teeth in the shrews, for the details of which I must refer the reader to Duvernoy's first memoir on these animals. I shall simply observe here, that the teeth do not receive their first development within the osseous portion of the jaw to be afterwards gradually evolved, as in the case of other Mammalia, but are found from the period of birth in the exact places they are to occupy in after-life, being simply enveloped by the periosteum of the bone to which they are attached. From this and other circumstances, Duvernoy infers that in these animals there are no milk-teeth to be succeeded by a second set at the season of maturity.

middle incisors and the first molar. In a young individual of the *S. leucodon* (brought from Germany by Mr. Ogilby), in which species the first lateral incisor is very much larger, in relation to the following ones, than in any of those met with in our own country, this tooth, in addition to the middle incisors and the molars, was found prominent, whilst the second and third lateral incisors were still concealed. This individual was sufficiently grown to have attained the length of $2\frac{1}{2}$ inches, and so little did it wear any appearance of immaturity, that the characters of the teeth might at first have been considered as indicating a peculiar type of dentition quite distinct from that which belongs to the adult animal. It was not till the investing periosteum had been removed with the point of a needle that the anomaly was explained.

In the case of *very old* specimens, the teeth lose much of their true character, in consequence of the attrition to which they become subjected by long use. In one individual of the *S. tetragonurus*, in my possession, the alteration from this circumstance is very considerable. The upper middle incisors are positively ground down to beyond the point of bifurcation, so as to have entirely lost all appearance of their original typical form: the edge of the lower incisors has become entire, the denticulations being quite effaced, and no trace of colouring (which is generally confined to the tips of the teeth) anywhere remains*.

Swaffham Bulbeck, June 8, 1838.

* [It may be well to direct the author's attention, as well as that of the reader, to a very valuable memoir lately published in Wiegmann's Archiv, (Part I. for 1838) on the European shrews, by H. Nathusius. In this paper, which is only the first and *historical* part, the author carefully reviews the various works and memoirs on this interesting family, and thus notices Mr. Jenyns's first memoir published in the second volume of the Magazine of Zoology and Botany: "The most recent paper with which I am acquainted is a very excellent memoir, by Jenyns, on the British shrews. In this Duvernoy's incorrect statement respecting the dentition of the *Hydrosoridae* has unfortunately caused a new error. Jenyns fully proves that *S. Araneus* of all English authors is not the species described by Daubenton, but the *S. tetragonurus*, Herm., and considers it probable that Linnæus was acquainted with this species, which, from Swedish specimens and Linnæus's first statement, now appears to me to be no longer at all doubtful. *S. Araneus* is stated hitherto never to have been seen in England. Respecting the British water shrew, Jenyns is however in error, as, following Duvernoy's description, he considers it to be different from the one of the continent; he therefore, with Shaw, names it *S. bicolor*. From his good description, however, it is evident that they do not differ from one another."

The author, after going through the history of this family, has carefully arranged the numerous synonyms in chronological order.—EDIT.]